Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended): A catalyst composition effective for the selective hydrogenation of alkynes and diolefins to olefins including active components ~~optionally~~ combined with a support, said active components consisting of:

(a) a rhodium component deposited from a nitrate precursor and present in an amount less than 3.0% of rhodium by weight of the total catalyst composition; and

(b) an indium component deposited from a nitrate or formate precursor and present in an amount at least 0.3% and less than 5.0% of indium by weight of the total catalyst composition.

Claim 2 (Previously Presented): The catalyst composition of claim 1 and wherein rhodium is present in an amount at least 0.25% and less than 2.5% by weight of the total catalyst composition.

Claim 3 (Previously Presented): The catalyst composition of claim 1 and wherein rhodium is present in an amount at least 0.3% and less than 1.5% by weight of the total catalyst composition.

Claim 4 (Previously Presented): The catalyst composition of claim 1 and wherein indium is present in an amount at least 0.4% and less than 4.0% by weight of the total catalyst composition.

Claim 5 (Previously Presented): The catalyst composition of claim 1 and wherein indium is present in an amount at least 0.5% and less than 3% by weight of the total catalyst composition.

Claim 6 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.2 to about 1.1.

Claim 7 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.35 to about 0.75.

Claim 8 (Previously Presented): The catalyst composition of claim 1 and wherein said support is present.

Claim 9 (Previously Presented): The catalyst composition of claim 8 wherein the support is selected from alumina, zirconia and ceria-alumina.

Claim 10 (Previously Presented): The catalyst composition of claim 1 wherein the catalyst composition has been treated in a reducing atmosphere at a temperature of at least 300°C.

Claim 11 (Previously Presented): A method for making a catalyst composition, the method comprising:

(a) applying a rhodium nitrate to an alumina, zirconia, or ceria-alumina support; and

(b) applying an indium formate or nitrate to the support; to produce a catalyst composition according to claim 1.

Claim 12 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support concurrently.

Claim 13 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support consecutively.

Claim 14 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by impregnating the support with a solution of the compound.

Claim 15 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by precipitating the compound from a solution containing ions of at least one of rhodium and indium.

Claims 16 - 18 (canceled)

Claim 19 (Original): The method of claim 11 and further including, after at least one of (a) and (b), calcining the support at a temperature of about 100°C to about 600°C.

Claim 20 (Original): The method of claim 11 and further including, after (a) and (b), treating the support in a reducing atmosphere at a temperature of about 100°C to about 600°C.

Claim 21 (Original): The method of claim 20 wherein said treating the support is conducted at a temperature of about 300°C to about 500°C.

Claim 22 (Withdrawn): A process for selectively removing alkynes or diolefins from a feedstock also containing olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition made by the method of claim 11.

Claim 23 (Previously Presented): A process for selectively removing C_2 to C_4 alkynes or diolefins from a feedstock also containing C_2 to C_4 olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition according to claim 1.

Claim 24 (Previously Presented): The process of claim 23, said process producing an olefin-enriched product stream comprising less than 10 weight % of oligomers of said olefins.

Claim 25 (Cancelled)

Claim 26 (Previously Presented): The process of claim 23, wherein the alkynes or diolefins have 2 to 4 carbon atoms and the feedstock also contains C_2 to C_4 olefins

Claim 27 (Previously Presented): The process of claim 23, wherein said contacting is conducted at a temperature of from about 20°C to about 150°C, a pressure of from about 690 kPa to about 4100 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1 to about 1000.

Claim 28 (Previously Presented): The process of claim 23, wherein said contacting is conducted at a temperature of from about 30°C to about 100°C, a pressure of from about 1400 kPa to about 3400 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1.1 to about 800.

Claim 29 (Previously Presented): The process of claim 23, wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 1 ppm.

Claim 30 (Previously Presented): The process of claim 23, wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 0.5 ppm.

Claim 31 (Previously Presented): A supported catalyst composition consisting essentially of a rhodium component and an indium component, said supported catalyst composition effective for the selective hydrogenation of alkynes and diolefins to olefins, wherein said support is selected from the group consisting of alumina, zirconia, or ceria-alumina; said catalyst composition further characterized as having less than 3.0 %

rhodium by weight of the total supported catalyst composition, deposited from rhodium nitrate; and having 0.3-5.0% indium by weight of the total supported catalyst composition, deposited from indium nitrate or indium formate.

Claim 32 (Previously Presented): The supported catalyst composition of Claim 31, wherein said support is selected from the group consisting of theta alumina and zirconia.

Application No. 10/720,617
Attorney Docket No. 2003B125

SUPPORT FOR THE AMENDMENT

The presence of a support for the catalyst is supported throughout the disclosure and examples of the specification.